

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE (TYPE S PITOT TUBE)

Applicability

This method is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream using an S type pitot tube. This method is not applicable at measurement sites that fail to meet the criteria of Method 1, Section 11.1. Also, the method cannot be used for direct measurement in cyclonic or swirling gas streams.

Apparatus (*Check applicable*):

_____ **Type S Pitot tube** made of metal tubing with an external diameter between 0.48 and 0.95 centimeters (3/16 and 3/8 inch). There shall be an equal distance from the base of each leg of the pitot to its face-opening plane. The face openings shall be aligned as shown in Figure 2-2 of the Method, however slight misalignments are permissible. The pitot shall have a known coefficient, determined as outlined in Section 4 of the Method. If a baseline coefficient value of 0.84 is assigned to the pitot tube and upon inspection does not meet the criteria set forth in Section 4 of the Method, that pitot tube will not be used.

_____ **Standard Pitot tube.** If a standard pitot tube will be used, it must meet the specifications of Section 6.7 and 10.2 of the method. It will be checked to insure the impact holes are free from obstruction. If there are particulates in the gas stream then the steps in Section 6.1.2 of the method will be taken to insure the holes are not plugged during the test (ie. back purging of the pitot and comparing the pre and post readings).

Differential Pressure Gauge (*choose one*)

_____ An inclined manometer will be used.

_____ The equivalent of an inclined manometer will be used as follows:

(If another type of differential pressure gauge is used, ie. Magnahelic, etc., their calibration must be checked after each test series.)

Note: most gauges have a 10 in. (H₂O column) inclined vertical scale, having 0.01 in. H₂O divisions on the 0 to 1 in. scale, and 0.1 in. H₂O divisions on the 1 to 10 in. vertical scale. This type of manometer is acceptable for delta p values as low as 1.3 mm (0.05 in.) H₂O. **However, a gauge of greater sensitivity will be used if any of the following is found to be true:** (1) the arithmetic average of all delta p readings at the traverse points in the stack is less than 1.3 mm (0.05 in.) H₂O; (2) for traverses of 12 or more points, more than 10 percent of the individual delta p readings are below 1.3 mm (0.05 in.) H₂O, or (3) for fewer than 12 points, more than one delta p reading is below 1.3 mm (0.05 in.) H₂O.

As an alternative for the preceeding three criteria, the calculation in Section 2.2 of the method can be used to determine the necessity of using a more sensitive differential pressure gauge.

Expected delta p range = _____

Inclined manometer scale = _____

An alternative flow measuring device will be used as follows:

Procedure

A pretest leak check of the pitot tube and manometer will be conducted as per Section 3.1 of the method. The manometer will be leveled and zeroed prior to use as well as periodically checked during the test.

The velocity head and temperature will be measured at each traverse point specified by EPA Method 1. The static pressure in the stack will be measured during the test as well as the atmospheric pressure. The stack gas dry molecular weight will be determined in accordance with EPA Method 3 or 3A.

Calculations

All calculations will be performed in accordance with Section 5 of the method.

Proposed deviations from the Method or this BTS template: